Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

Claims 1-20 (canceled)

21 (new). A method for characterizing fluorescent molecules or other particles in samples comprising the steps of

a) monitoring fluctuating intensity of fluorescence emitted by the molecules or other particles in at least one measurement volume of a non-uniform spatial brightness profile by measuring numbers of photon counts in primary time intervals by a single or more photon detectors,

b) determining at least one distribution function of numbers of photon counts, $P(\mathbf{n})$, from the measured numbers of photon counts,

c) determining physical quantities characteristic to said particles by fitting the experimentally determined distribution function of numbers of photon counts,

wherein the fitting procedure involves calculation of a theoretical distribution function of the number of photon counts $P(\mathbf{n})$ through its generating function, defined as

$$G(\zeta) = \sum_n \zeta^n P(n)$$

wherein in step c) when calculating the theoretical distribution $P(\mathbf{n})$, the spatial brightness profile is modeled by a mathematical relationship between volume and spatial brightness, wherein in step c),

when calculating the theoretical distribution $P(\mathbf{n})$, the spatial brightness profile is modeled by the following expression:

$$\frac{dV}{dx} = A_0 x(1 + a_1 x + a_2 x^2),$$

where dV denotes a volume element, x denotes logarithm of the relative spatial brightness, and a_1, a_2, and a_3 are empirically estimated parameters.

22 (new). A method for characterizing fluorescent molecules or other particles in samples comprising the steps of

a) monitoring fluctuating intensity of fluorescence emitted by the molecules or other particles in at least one measurement volume of a non-uniform spatial brightness profile by measuring numbers of photon counts in primary time intervals by a single or more photon detectors,

b) determining at least one distribution function of numbers of photon counts, $P(\mathbf{n})$, from the measured numbers of photon counts,

c) determining physical quantities characteristic to said particles by fitting the experimentally determined distribution function of numbers of photon counts,

wherein the fitting procedure involves calculation of a theoretical distribution function of the number of photon counts $P(\mathbf{n})$ through its generating function, defined as

$$G(\zeta) = \sum_n \zeta^n P(n)$$

wherein in step c) when calculating the theoretical distribution $P(\mathbf{n})$, the spatial brightness profile is modeled by a mathematical relationship between volume and spatial brightness, and wherein in step c) when calculating the theoretical distribution $P(\mathbf{n})$, the spatial brightness profile is modeled by a mathematical relationship between volume and spatial brightness, wherein in step c) who calculating the theoretical distribution $P(\mathbf{n})$, the spatial brightness profile is modeled by the following expression:

$$\frac{dV}{dx} = A_0 x(1 + a_1 x + a_2 x^2),$$

where dV denotes a volume element, x denotes logarithm of the relative spatial brightness, and a_1 and a_2 are empirically estimated parameters.

Amendments to the Drawings:

In the drawings corrections proposed, hereby, each of Figures 10A,B and 10C,D is independently referenced and Figures 14, 15 and 18 are referenced as Figures 14A, 14B 15A, 15B, 18A, and 18B, as required in the objection to the drawings.